

## WHAT WE CLAIM IS:

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1. A fuel blend for use in an internal combustion engine, the fuel blend comprising:  
 5 a hydrocarbon-containing fuel component;  
 an oxygen-containing component capable of providing oxygen for combustion of  
 the fuel component under conditions prevailing during the combustion cycle of the  
 internal combustion engine;  
 wherein the major oxygen-providing agent of the oxygen-containing component  
 is one or more compounds having the general formula (I):



wherein  $R_1$  is selected from hydrogen, lower alkyl, lower alkenyl and lower  
 alkynyl groups;

15  $R_2$  is selected from lower alkyl, lower alkenyl and lower alkynyl groups, or a  
 group having the general formula (II):



20 wherein  $R_3$  is selected from lower alkyl, lower alkenyl and lower alkynyl groups;  
 and  
 $R_4$  is selected from lower alkyl groups.

2. A fuel blend as claimed in claim 1, wherein  $R_1$  is selected from hydrogen,  $C_1$  or  
 25  $C_2$  alkyl,  $C_2$  alkenyl and  $C_2$  alkynyl groups.

3. A fuel blend as claimed in claim 2, wherein  $R_1$  is selected from hydrogen,  $C_1$  or  
 $C_2$  alkyl.

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4. A fuel blend as claimed in claim 3, wherein  $R_1$  is methyl.
5. A fuel blend as claimed in claim 3, wherein  $R_1$  is ethyl.
- 5 6. A fuel blend as claimed in claim 1, wherein  $R_2$  is selected from  $C_1$  to  $C_4$  alkyl,  $C_2$  alkenyl and  $C_2$  alkynyl groups.
7. A fuel blend as claimed in claim 6, wherein  $R_2$  is  $C_1$  or  $C_2$  alkyl.
- 10 8. A fuel blend as claimed in claim 7, wherein  $R_2$  is methyl.
9. A fuel blend as claimed in claim 7, wherein  $R_2$  is ethyl.
- 15 10. A fuel blend as claimed in claim 1, wherein the compound of general formula (I) is methyl acetate.
11. A fuel blend as claimed in claim 1, wherein the compound of general formula (I) is ethyl acetate.
- 20 12. A fuel blend as claimed in claim 1, wherein the compound of general formula (I) is methyl formate.
13. A fuel blend as claimed in claim 1, wherein the compound of general formula (I) is ethyl formate.
- 25 14. A fuel blend as claimed in claim 1, wherein the compound of general formula (I) is tertiary butyl acetate.

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cont.

15. A fuel blend as claimed in claim 1, wherein  $R_2$  is a group of general formula (II), in which  $R_3$  is a  $C_1$  to  $C_4$  alkyl.

16. A fuel blend as claimed in claim 15, wherein  $R_4$  is a  $C_1$  to  $C_4$  alkyl.

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17. A fuel blend as claimed in claim 14, wherein  $R_3$  and  $R_4$  are each independently selected from  $C_1$  or  $C_2$  alkyl.

18. A fuel blend as claimed in claim 1 in which the compound of general formula (I) is ethylene glycol diacetate.

19. A fuel blend as claimed in claim 1, wherein the hydrocarbon-containing fuel component is selected from the group consisting of diesel and gasoline.

20. A fuel blend as claimed in claim 1, wherein the major oxygen-providing component comprises a first compound of formula (I), in which  $R_2$  is ethyl, and a second compound of formula (I), in which  $R_2$  is methyl.

21. A fuel blend as claimed in claim 20, wherein both the first and second compounds are compounds in which  $R_1$  is a  $C_1$  to  $C_4$  alkyl.

22. A fuel blend as claimed in claim 21, wherein the first compound and the second compound are present in a ratio of from 1:5 to 5:1.

23. A fuel blend as claimed in claim 21, wherein the first compound and the second compound are present in a ratio of from 1:1 to 1:1.5.

24. A fuel blend as claimed in claim 23, wherein the first compound is methyl acetate and the second compound is ethyl acetate.

25. A fuel blend as claimed in claim 1, wherein the major oxygen-providing component comprises a first compound of formula (I), in which  $R_2$  is a group of general formula (II), and a second compound of formula (I), in which  $R_2$  is a  $C_1$  to  $C_4$  alkyl.

26. A fuel blend as claimed in claim 25, wherein the first compound is a compound in which  $R_1$  is a  $C_1$  to  $C_4$  alkyl.

27. A fuel blend as claimed in claim 26, wherein the second compound is a compound in which  $R_1$  is a  $C_1$  to  $C_4$  alkyl.

28. A fuel blend as claimed in claim 27, wherein the first compound is ethylene glycol diacetate.

29. A fuel blend as claimed in claim 28, wherein the second compound is selected from methyl acetate, ethyl acetate and mixtures thereof.

30. A fuel blend as claimed in claim 25, wherein the first compound and second compound are present in a ratio of from 0.5:1 to 10:1.

31. A fuel blend as claimed in claim 30, wherein the first compound and second compound are present in a ratio of from 1:1 to 5:1.

32. A fuel blend as claimed in claim 1, further comprising a stabilizer.

33. A fuel blend as claimed in claim 32, wherein the stabilizer is selected from alcohols having from 1 to 8 carbon atoms.

34. A fuel blend as claimed in claim 33, wherein the stabilizer is selected from alcohols having from 2 to 5 carbon atoms.

35. A fuel blend as claimed in claim 34, wherein the stabilizer is ethanol.

36. A fuel blend as claimed in claim 32, wherein the compound of general formula (I) and the stabilizer are present in a ratio of from 20:1 to 150:1.

37. A fuel blend as claimed in claim 36, wherein the compound of general formula (I) and the stabilizer are present in a ratio of from 75:1 to 125:1.

38. A fuel blend as claimed in claim 1, further comprising an alcohol having from 2 to 5 carbon atoms and bearing one or more alkyl substituents.

39. A fuel blend as claimed in claim 38, wherein the alcohol is an alkyl substituted butyl alcohol.

40. A fuel blend as claimed in claim 39, wherein the alcohol is tertiary butyl alcohol.

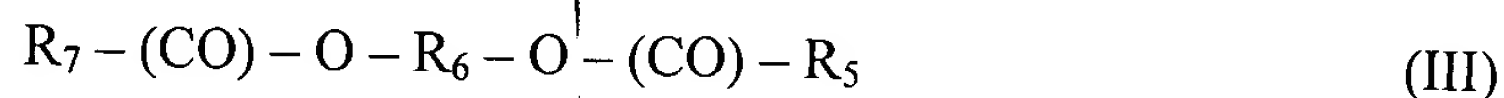
41. A fuel blend as claimed in claim 38, wherein the alcohol and the compound of general formula (I) are present in a ratio of from 1:0.6 to 1:5.

42. A fuel blend as claimed in claim 1, further comprising a biocide.

43. A fuel blend as claimed in claim 1, wherein the hydrocarbon-containing fuel component is gasoline and the compound of general formula (I) is present in an amount sufficient to provide an oxygen-content in the fuel blend of 1 to 5 percent by weight.

44. A fuel blend as claimed in claim 1, wherein the hydrocarbon-containing fuel component is diesel and the compound of general formula (I) is present in an amount sufficient to provide an oxygen-content in the fuel blend of 1 to 10 percent by weight.

5 45. An oxygenating additive for a hydrocarbon-containing fuel comprising:  
a first compound having a general formula (III):



10 wherein  $R_5$  is selected from lower alkyl, lower alkenyl and lower alkynyl groups;

$R_6$  is selected from lower alkyl; and

wherein  $R_7$  is selected from lower alkyl, lower alkenyl and lower alkynyl groups;

and

15 a second compound having a general formula (IV):



20 wherein  $R_8$  is selected from hydrogen, lower alkyl, lower alkenyl and lower alkynyl groups; and

$R_9$  is selected from lower alkyl, lower alkenyl and lower alkynyl groups.

46. An oxygenating additive as claimed in claim 45, wherein  $R_5$  is selected from  $C_1$  to  $C_4$  alkyl.

25 47. An oxygenating additive as claimed in claim 46, wherein  $R_5$  is methyl.

48. An oxygenating additive as claimed in claim 45, wherein  $R_6$  is ethyl.

49. An oxygenating additive as claimed in claim 45, wherein R<sub>7</sub> is selected from C<sub>1</sub> to C<sub>4</sub> alkyl.

50. An oxygenating additive as claimed in claim 49, wherein R<sub>7</sub> is methyl.

51. An oxygenating additive as claimed in claim 45, wherein the compound of general formula (III) is ethylene glycol diacetate.

52. An oxygenating additive as claimed in claim 45, wherein  $R_8$  is selected from hydrogen, and  $C_1$  to  $C_4$  alkyl.

53. An oxygenating additive as claimed in claim 52, wherein R<sub>8</sub> is methyl.

54. An oxygenating additive as claimed in claim 45, wherein R<sub>9</sub> is selected from C<sub>1</sub> to C<sub>4</sub> alkyl.

55. An oxygenating additive as claimed in claim 54, wherein R<sub>9</sub> is selected from methyl and ethyl.

56. An oxygenating additive as claimed in claim 45, wherein the compound of general formula (IV) is selected from methyl acetate and ethyl acetate and mixtures thereof.

57. An oxygenating additive as claimed in claim 45, wherein the compound of general formula (III) and the compound of general formula (IV) are present in a ratio of from 0.5:1 to 5:1.



58. An oxygenating additive as claimed in claim 57, wherein the compound of general formula (III) and the compound of general formula (IV) are present in a ratio of from 1:1 to 2.5:1.

59. An oxygenating additive as claimed in claim 45, further comprising a biocide.

60. An oxygenating additive as claimed in claim 45, further comprising a stabilizer.

61. An oxygenating additive as claimed in claim 60, wherein the stabilizer is selected from alcohols having from 2 to 5 carbon atoms.

62. An oxygenating additive as claimed in claim 61, wherein the stabilizer is ethanol.

63. An oxygenating additive as claimed in claim 60, wherein the ratio of the combined amounts of the compounds of general formulae (III) and (IV) to the stabilizer is from 20:1 to 150:1.

64. An oxygenating additive as claimed in claim 63, wherein the ratio of the combined amounts of the compounds of general formulae (III) and (IV) to the stabilizer is from 75:1 to 125:1.

65. An oxygenating additive for a hydrocarbon fuel comprising a first and a second compound, both the first and the second compounds having the general formula (I):



wherein  $R_1$  in each of the first and the second compound is independently selected from hydrogen, lower alkyl, lower alkenyl and lower alkynyl groups; and



$R_2$  in each of the first and second compound is independently selected from lower alkyl, lower alkenyl and lower alkynyl groups.

5 66. An oxygenating additive as claimed in claim 65, wherein  $R_1$  and  $R_2$  in each of the first and second compounds are both independently selected from hydrogen, and lower alkyl groups.

10 67. An oxygenating additive as claimed in claim 66, wherein the first compound is methyl acetate and the second compound is ethyl acetate.

68. An oxygenating additive as claimed in claim 67, wherein methyl acetate and ethyl acetate are present in a ratio of from 1:2 to 2:1.

15 69. An oxygenating additive as claimed in claim 68, wherein methyl acetate and ethyl acetate are present in a ratio of 1:1.

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